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9 Glossary of Terms

Listed in alphabetical order below are terms and definitions that OWM uses throughout various watershed land management plans. Specific sources of definitions are shown in parenthesis, where applicable.

age class: (from Society of American Foresters, 1971. Terminology of forest science, technology, practice, and products.) one of the intervals, commonly 10 years, into which the age range of tree crops (and sometimes other vegetation) is divided for classification or use.

aggradation: (from Bormann and Likens, 1979. Pattern and process in a forested ecosystem.) in Northern Hardwoods, a period of more than a century when the ecosystem accumulates total biomass reaching a peak at the end of the phase; preceded by the reorganization phase and followed by the transition phase.

advance regeneration: in silvicultural terms, young trees that have become established naturally in a forest, in advance of regeneration cutting; may become established following "preparatory" cuts.

allogenesis: changes in an ecological community primarily through periodic, acute, external (exogenous) disturbances, such as storms. These changes generally reset the successional progression of the community.

area inch; acre inch: used to describe changes in water yield from a given area of land; for instance, if a change in vegetation results in an increase of one acre inch in water yield, this translates to 43,560sq ft x 1/12ft = 3,630 cubic feet per acre; $3{,}630ft^3$ / 7.5 gals per ft^3 = 484 gallons additional yield per acre. Area inch is translated to percent water yield increase by dividing area inch by total inches of yield. For example 40 inches of precipitation generally yields 50%, or 20 inches of discharge, therefore a 2 area inch increase in yield on this watershed is a 10% increase (2/20).

autogenesis: changes in an ecological community primarily through the regular, internal processes of growth, competition, and senescence, which are general endogenous (within community) forces that result in a steady successional progression of the community.

basin; sub-basin: the land area from which all water flows to a single, identified water source, such as a stream, a river, or a reservoir. Sub-basin is used to refer to the basin of a tributary or lower *order* stream (the higher the order, the greater the area drained).

basal area: the area in square feet of the cross section of a tree taken at 4.5 feet above the ground.

"beaver pipe"; flow control pipe: generally a length of culvert that is extended into a beaver pond and at or near the top of the beaver dam, in order to maintain the pond level at a particular level.

Best Management Practices, BMPs: in natural resources management, refers to a set of standards that have been designed for an activity, and often a region, to protect against degradation of resources during management operations.

biological diversity (biodiversity): a measure, often difficult to quantify, of the variety and abundance of plant and animal species within a specified area, at the genetic, species, and landscape level of analysis. The 1992 UN Convention on Biological Diversity defined biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the

ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

biomass: (SAF) the total quantity of living organisms of one or more species per unit area (species biomass) or of all the species in a community (community biomass)

conservation restriction; conservation easement; CR: a legal agreement between a landowner and another party whereby the landowner deeds the rights to development of the property to the other party, but retains ownership of the land and other rights to its use. Specific agreement varies, but the general result is to protect land from conversion to new uses without requiring transfer of ownership; OWM also limits or retains the right to approve certain agricultural and silvicultural practices in its CRs.

Continuous Forest Inventory (C.F.I.): an extensive method of forest inventory in which permanent sample plots are remeasured at periodic intervals to determine forest growth and condition; OWM's CFI is composed of 1/5 acre permanent plots, located on a 1/2 mile grid, and remeasured every 10 years.

cutting cycle: the frequency with which silvicultural cuttings are conducted in any given area; cutting cycle is a subunit of "rotation," which is determined either by the maximum life of the existing overstory, or by a predetermined maximum age imposed on the area.

Cryptosporidium: A coccidian protozoan parasite found in humans and various wild and domestic animals that can be transmitted via water and often causes serious intestinal illness. While the epidemiology and transmission of *Cryptosporidium* are similar to *Giardia*, its oocysts are smaller that the cysts of other protozoa, and thus may be more difficult to remove from water supplies.

diameter at breast height; DBH: the diameter of a tree, outside the bark, taken at 4.5' above the ground, generally in inches and fractions.

diverse/diversity: in this plan, the term is most often used to refer to forest composition, and refers to both height or size diversity in trees, seeking a minimum of three distinct layers (understory, midstory, and overstory), and to diversity of species composition, with a general goal of avoiding monocultures and working to include components of hemlock, pine, oak, birch, and maple throughout the forest.

disturbance-sheltered: areas that based on slope and aspect are physically "sheltered" from the influence of a catastrophic New England hurricane blowing from the southeast, based on a model developed at the Harvard Forest; the most sheltered areas are steep slopes facing northwest.

edge effect: this term has traditionally been used to describe the increased richness of flora and fauna found where two habitat types or communities meet. More recently, the term has also been used to refer to the increased predation and brood parasitism that often occurs near these boundaries.

endogenous disturbance: disturbance that originates within the ecological community. For example, a single tree that succumbs to a root-rot fungus and falls to the ground, breaking off several other trees on the way, creates an endogenous disturbance. While the proximal cause of the treefall may be wind or accumulation of snow and ice, the primary cause is still considered endogenous in this instance. (see exogenous disturbance below)

even-aged: (SAF) an area of forest composed of trees having no, or relatively small, differences in age. NOTE: By convention the maximum difference admissible is generally 10 to 20 years, though with rotations of 100 years or more, differences up to 30% of the rotation may be admissible.

exogenous disturbance: disturbance that originates from forces outside of the ecological community. For example, storms that carry high winds can cause large-scale treefall well in advance of normal senescence and decay. The cause of the disturbance is therefore considered exogenous. (see endogenous disturbance above)

feller-buncher; feller-buncher-processor: logging machines that grasp a tree to be cut or "felled," sever it at the stump with either a saw or hydraulic shears, and directionally drop it to the ground. Some machines can accumulate, or "bunch" several trees before releasing them. The most complex machines are also capable of delimbing and sawing trees into predetermined lengths (processing).

forest canopy: (SAF) the more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

forest fragmentation: the separation of a previously contiguous forested area into discontinuous patches or "fragments." These fragments are less useful to wildlife that require large contiguous habitats. Fragmentation by suburban development is likely to be detrimental to "deep woods" species, while the simple break imposed by an access road is not often an impediment.

forwarder: a logging machine used to "forward" logs from the woods to a landing. A forwarder differs from a skidder in that the logs are hydraulically loaded onto the machine and carried, rather than skidded through the woods.

G.I.S.: Geographic Information System - a computer-based analysis and mapping system for spatially-linked data sets.

***Giardia*:** A protozoan parasite found in humans and various wild and domestic animals that can be transmitted via water and often causes serious intestinal illness.

hurricane exposure ("exposed," "intermediate," "sheltered"): generally used in OWM management plans to mean physical exposure of a site to catastrophic hurricane winds, those coming from the southeast. Research at the Harvard Forest in Petersham, MA provides a model of the impact of this typical New England hurricane, which includes slope and aspect. Actual damage will depend on the type and size of vegetation present.

intermediate cut: cutting of trees in a stand during the period between establishment and maturity. Objectives may include the improvement of vigor by reducing competition or the manipulation of species composition. Regeneration may occur following intermediate cuts, but it is incidental to the objectives.

irregular shelterwood: similar to the shelterwood silvicultural system except that overstory removals are protracted, taking as long as half the rotation, so that the resulting new stand is quite uneven-aged (wide intervals between the oldest and youngest trees) and mimics the multi-storied effect of strictly uneven-aged systems.

log landing; landing: a clearing of variable size to which logs, pulp, and/or firewood are skidded or forwarded during a logging operation, in order to facilitate their processing or further transport by truck.

mast: the fruit and seeds of trees and shrubs. Mast constitutes an important food source for many wildlife species.

milacre: one-thousandth of an acre**.**

mineral soil: any soil consisting primarily of minerals (sand, silt, and clay), rather than organic matter.

multi-storied or multi-layered forest: a forest containing a distinct understory, midstory, and overstory. From a watershed perspective, these layers provide, respectively, immediate response to disturbance, vigorous uptake of nutrients, and deep filtration of air-borne and precipitative pollutants.

naturally managed: the results of a deliberate decision to allow natural disturbances and processes prevail by adopting a minimal management approach that protects forests from development or other land use changes and possibly human-caused fire, but which includes vegetation management only where it clearly counteracts a negative result from previous human disturbances.

old-growth: various definitions, but one definition in Massachusetts is that old-growth must contain at least four acres in which the dominant trees are late-successional species, have reached at least half the potential maximum age of the species with a few trees at or near that age (e.g., birches/maples at 300 years or hemlocks at 400), have late-successional tree regeneration present, and show little or no evidence of human or large-scale natural disturbance during the current stand's development.

preparatory cutting: (SAF) removing trees near the end of a rotation so as to open the canopy and enlarge the crowns of seed bearers, with a view to improving conditions for seed production and the establishment of natural regeneration.

protected: refers to areas of the watershed that, according to the Harvard Forest model of hurricane disturbance, would suffer minimal damage from the recurrence of a hurricane similar to that of 1938, due primarily to topography and orientation.

protection forest: (SAF) an area, wholly or partly covered with woody growth, managed primarily to regulate stream flow, maintain water quality, minimize erosion, stabilize drifting sand, or to exert any other beneficial forest influences

regeneration: recently established tree growth, generally smaller than one inch dbh; also, the process of establishing this growth, as in "bring about the regeneration of a forest area".

regeneration cut: (SAF) any removal of trees intended to assist regeneration already present or to make regeneration possible.

riparian: pertaining to the bank of a stream or other water body; (SAF) vegetation growing in close proximity to a watercourse, lake, swamp, or spring, and often dependent on its roots reaching the water table.

rotation: in conventional forestry, rotation is (SAF) the planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage of maturity. In the selection system of uneven-aged management, however, the concept of a rotation is replaced with the average age of trees removed to initiate regeneration.

salvage; salvage cutting: the removal of trees damaged by fire, wind, insects, disease, fungi, or other injurious agents before their timber becomes worthless. In some situations, the motivation is the reduction of fuel loading and fire hazard. Sanitation cutting is related, but is a proactive removal of diseased or highly susceptible trees in order to slow or halt the spread of a disease or other destructive agent.

seep: a wet area, generally associated with groundwater seepage, which is important to wildlife because it remains unfrozen, and generally uncovered, during periods when the ground is otherwise snow-covered, which makes it easier for wildlife to forage for seeds.

shelterwood: (SAF) mostly even-aged silvicultural systems in which, in order to provide a source of seed, protection for regeneration, or a specific light regime, the overstory (the shelterwood) is removed in two or more successive shelterwood cuttings, the first of which is ordinarily the seed cutting (though it may be preceded by a preparatory cutting) and the last of which is the final cutting, while any intervening cuttings are termed removal cuttings. Note that where adequate regeneration is already present, the overstory may be removed in one cutting, resulting in a method referred to as a one-cut shelterwood.

silviculture: (SAF) generally, the science and art of cultivating (i.e., growing and tending) forest crops, based on a knowledge of silvics (the study of the life history and general characteristics of forest trees and stands, with particular reference to environmental factors affecting growth and change). More particularly, silviculture is the theory and practice of controlling the establishment, composition, constitution, and growth of forests.

site: in forestry, the combination of environmental factors that affect the ability of a species to grow and persist, including at least soil characteristics, aspect, altitude and latitude, and local climate. Sites are often classified by the ability of specific trees to grow on them.

site index: the ability of a given site to grow a given species. As height growth is generally not density dependent, a common forestry site index is the height to which a given species will grow on the site in fifty years (so that a site with a Red Oak site index of 65 will grow Red Oak to that height in fifty years).

site preparation: in silviculture, any of a variety of treatments of a site that are intended to enhance regeneration success. A common goal of these treatments is to remove enough of the accumulated organic layers above the mineral soil so as to expose that soil and enhance the ability of seeds that fall on it to germinate and grow. The simple skidding of logs is an incidental, and often sufficient, site preparation.

site-suited: species that have evolved to take advantage of a particular type of site. Where species are planted on other sites, they may succumb prematurely to disturbance or disease. Red pine grows and persists well on deep, sandy soils, where root rots are less common, but may become excessively prone to wind and or root rotting diseases on the moist agricultural soils on which they were typically planted.

skidder: logging machine used to "skid" logs from the woods to a landing or a forwarder road. Logs are either winched by cable to the skidder (cable skidder), or lifted on one end by a hydraulic grapple (grapple skidder), and then dragged.

stand: (SAF) a community of trees possessing sufficient uniformity as regards composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities.

steady state: (Bormann and Likens, 1979. p.4) "For the ecosystem as a whole, over a reasonable period of time gross primary production equals total ecosystem respiration, and there is no net change in total standing crop of living and dead biomass".

stocking: in forestry, the extent to which a site is occupied by trees compared to the maximum occupation possible at a given stand age; a relative measure of stand density. Most commonly measured as basal area per acre, stocking is often related directly to crown closure, as a site is considered fully occupied when

crown closure is complete (when each crown has grown to touch all adjacent ones). As crowns can be of very different sizes among species and tree ages within stands, average diameter (dbh) and total number of trees of a "fully stocked" site is variable.

stream order: a classification of streams within watersheds. Small streams at the uppermost level of stream systems are labeled "first-order"; two first-order streams join to form a "second-order" stream; two second-order streams join to form a "third-order" stream; etc.

succession: (SAF) the gradual supplanting of one community of plants by another, the sequence of communities being termed a "sere" and each stage "seral." Succession is "primary" (by "pioneer species") on sites that have not previously borne vegetation, "secondary" after the whole or part of the original vegetation has been supplanted; "allogenic" when the causes of succession are external to and independent of the community (e.g., a storm, or climate change), and "autogenic" when the developing vegetation is itself the cause. "Early succession" generally refers to the pioneer stages and species that follow disturbance, while "late succession" refers to stages and species that occur as an area continues to develop undisturbed for long periods.

thinning: an intermediate silvicultural treatment, generally with the goal of altering the forest composition and/or improving the growing conditions for the residual trees, regardless of associated regeneration effects. Most thinnings leave stands considered to be fully stocked, i.e., capable of fully occupying the site a short while after the thinning has been completed.

turbidity: a water quality measure that is most commonly derived by measuring the proportion of a given amount of light that is deflected by suspended/dissolved sediments in a water sample, giving an indirect measure of these sediments. Most common unit is the nephelometric turbidity unit, NTU.

uneven-aged: (SAF) a forest, crop, or stand composed of intermingling trees that differ markedly in age. By convention, a minimum difference between tree ages of 25% of the rotation age is generally accepted. Some texts require a minimum of three distinct age classes for a stand to qualify as "uneven-aged."

vernal pool: a temporary body of fresh water that provides crucial habitat for several vertebrate and many invertebrate species of wildlife, but does not support fish populations.

wetland: generally refers in OWM land management plans to areas defined as "wetlands" by M.G.L. C.131 § 40 (the "Wetlands Protection Act") and 310 C.M.R. 10.00 (the "Wetlands Protection Regulations"), updated as these are revised.